# *COEN-352 Tutorial #7*

March 5th, 2023

# Radix Sort

**RadixSort:** An almost linear sorting algorithm that does digit-by-digit sorting.

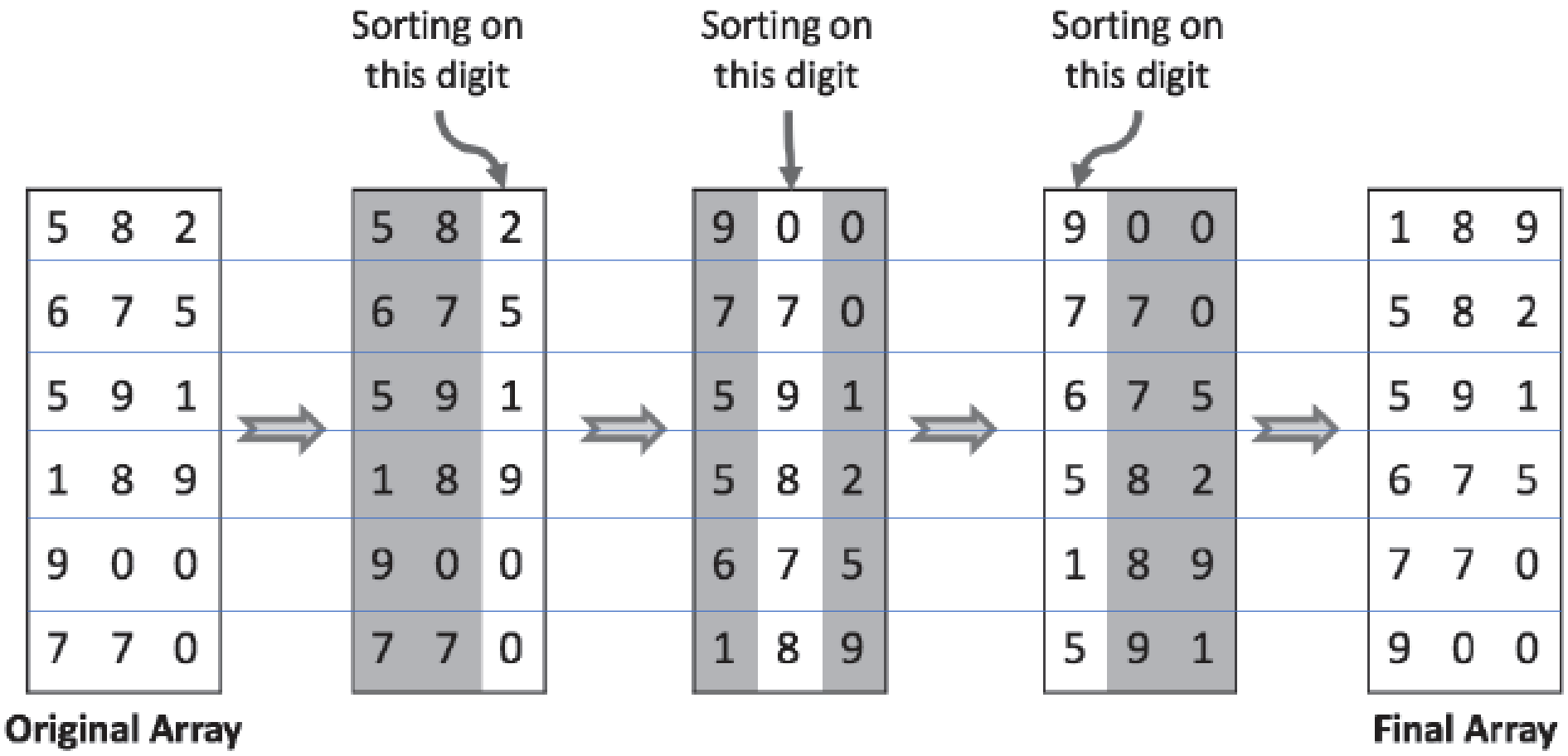
- It is not a comparative sorting algorithm.
- It uses Counting Sort as a subroutine to sort occurrences.

| **Time Complexity** | |
|---|---|
| Best | O(n+k) |
| Worst | O(n+k) |
| Average | O(n+k) |
| **Space Complexity** | O(max) |
| **Stability** | Yes |

O(n+k)

**QUESTION:** what is the lower bound of the algorithms we have seen already?

# Radix Sort Illustration



# Huffman Coding

**Def:** Huffman coding is a lossless data compression algorithm that uses priority binary trees.

- Each leaf represents an encoding
- Internal nodes also have a frequency weight
- Usually, left branches represent a `'0'` bit and right is `'1'` bit
- There could be more than one possible encoding

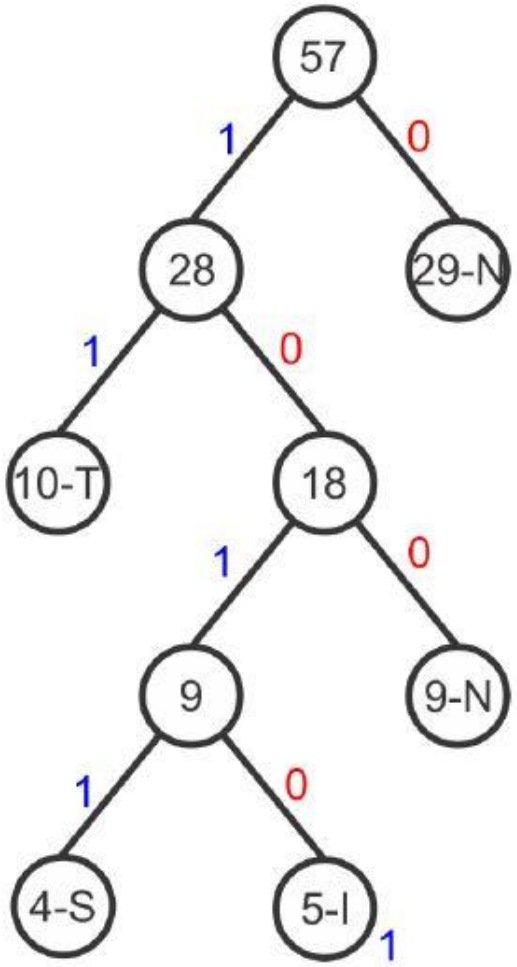
**Huffman Coding** is heavily used in data compression without losing any of the details.

- Compared to an ASCII encoding, in Huffman encoding the number of bits is dynamic not constant.

# Example: A Huffman Tree

| Chars | Frequency | Huff Code |
|---|---|---|
| E | 29 | 0 |
| T | 10 | 11 |
| N | 9 | 100 |
| I | 5 | 1010 |
| S | 4 | 1011 |

Result



# *THANK YOU*